

Open post-doctoral position:

Development of blood-bone marrow organ-on-chip to study platelet formation



Postdoctoral Research Position:

“Development of a bone marrow microvessel-on-chip to decipher the dialogue between megakaryocytes and endothelial cells that governs platelet formation”.

A postdoctoral position is available in Strasbourg (France) at INSERM UMR_S1255, initially funded for 18-24 months and will be extended depending on funding.

The laboratory works on blood platelet function and production, both of which are critical for normal hemostasis, i.e. stopping bleeding and preventing hemorrhage.

The team's projects focus on unresolved questions related to the formation of platelets in the bone marrow, in particular the role played by the mechanical and cellular microenvironment. How endothelial cells (BMECs) interact with megakaryocytes (the platelet precursor) for their transmigration within the blood vessel are still unresolved essential steps to understand normal and defective platelet production.

Alteration of marrow mechanics occurs during pathological conditions such as chemotherapy or during hematological cancers such as myeloproliferative neoplasms/myelofibrosis. The study of the hematopoietic marrow microenvironment is hampered by the difficulty of accessing and modulating this tissue, which is located inside compact bones. The development of organs-on-a-chip will facilitate the study of the hematopoietic marrow. The whole project aims to 1) develop and characterize a 3D bone marrow organ-on-chip; 2) evaluate the impact of flow forces (coupling shear and strain like *in vivo*) or modulation of matrix stiffness on the endothelial phenotype; 3) identify mechanisms used by BMECs to adapt to modifications of flow; 4) evaluate the impact of flow modulation on proplatelet transendothelial passage and release; 5) *in fine*, the mechanisms identified *in vitro* will be confirmed *in vivo* using genetically modified mice whenever possible.

Mission. The recruited researcher will be in charge of the development of the bone marrow organ-on-chip, its characterization and analysis of cell behavior upon modification of biophysical cues (matrix stiffness, flow). He/she will benefit from the help of a technician for cell culture and analyses. The project involves close collaboration with Abdul Barakat, a biophysicist at Ecole Polytechnique, who recently developed a microvessel-on-a-chip to study the impact of blood flow forces.

Requirements. We are looking for an enthusiastic and motivated fellow. The candidate must have a PhD in cell biology or a related field. Due to the interdisciplinarity of the project, the candidate need to be curious and motivated to learn new approaches and fields. A strong background in cell biology, cell culture and photonic imaging techniques is required. A background in mechanobiology would be appreciated.

Location. The institute is located in Strasbourg (France), directly in the city center. Strasbourg is a dynamic international scientific city with well renowned University and dynamic University Campus, 1h50 from Paris by train. Occasional travels and short stays at Ecole Polytechnique (Palaiseau) will be necessary.

Interested candidates should apply as soon as possible but date of arrival is open to discussion.

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References

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